

DIMENSIONS (<i>continued</i>).		inches. lines.	
Length from upper teeth to beginning of second dorsal	1	8	
_____ first ditto	1	4	
_____ anal	1	3	
_____ ventrals	1	11 $\frac{1}{2}$	
_____ pectorals	0	8	
_____ edge of gill-cover	0	7 $\frac{3}{4}$	
Diameter of the eye	0	2	
Length of snout before the eye	0	2	
Height of body	0	9	
Length of naked part of tail	0	4 $\frac{1}{2}$	

[To be continued.]

XXIX.—On the Structure and Functions of the Pollen Granules. By WILLIAM WILSON, Esq.

IN the 'London Journal of Botany' for November 1842, the results of a sedulous inquiry into the true structure and functions of the pollen-collectors of *Campanula* were presented to its readers; and in the following month a letter from Arthur Hill Hassall, Esq. appeared in the same Journal, directing my attention to his own remarks on the same topic, published in the 'Annals and Magazine of Natural History' for October last.

In acknowledging Mr. Hassall's courtesy, I beg to say that I had not seen his paper, or it would have been discussed when mine was written.

Mr. Hassall has misunderstood me. I endeavoured to state that the pollen granules are taken bodily into the interior of the collecting hairs, and are ultimately lodged in the imbedded cavities; but Mr. Hassall supposes that I allude only to the pollen tubes. Having met with only one instance of tubes from a pollen granule thus imbedded, I did not insist upon it as a fact, but reserved that point for future inquiry.

I must entirely dissent from Mr. Hassall's views. In the first place, I cannot admit the propriety of terming that part where the collecting hairs are found, a "stigma." He says that the papillæ of the stigmatic branches "resemble the hairs in everything save length;" but if the views of physiologists are right, as I believe them to be, there must be an essential difference between these *papillæ* (rounded sides of vesicles of cellular stigmatic tissue, according to Lindley,) and the *collecting hairs*, concerning the anatomy of which Mr. Hassall considers Brongniart to have given a satisfactory account; for the hairs are regarded by the latter as an extension of the cuticle covering the whole surface of the style.

In the second place, I deem it premature and hazardous,

especially after Brongniart's statement in reference to the stigmatic tissue as the proper passage for the pollen tubes, to advance the opinion that they "penetrate the interspaces between the hairs;" and I would ask, is not the cuticle a barrier to any such penetration? If the fact be as he supposes, I consider it quite capable of being demonstrated by careful and minute dissection. The formation of pollen tubes is by no means conclusive; for Mr. Hassall has elsewhere said (p. 103) that this occurs "on parts of the flower distant from the stigma." In one case I observed a cluster of pollen granules upon the style, with pollen tubes so completely interlaced as to form an entangled mass of flocculent matter; but none of these tubes seemed to have any intimate connexion with the style. I dare not even assert that they were not produced under the influence of the stigmatic fluid; for, since the publication of my paper, I have seen that the stigmatic branches ultimately become revolute, and their papillose surfaces are thus brought into contact with the pollen adhering to the style; but this takes place long after the emission of the pollen, so that it is difficult to regard the evolution of the stigmatic branches as marking the precise time of fecundation.

Mr. Hassall's intended experiment on the flowers of *Campanula pyramidalis*, interesting as it will be, will not prove that fecundation is not effected by means of the collecting hairs. In opposition to Brongniart, I have shown that they are really the *recipients of the pollen granules*, and that traces of a foramen exist at the extremity of each hair which has performed its function. I cannot suppose that all this singular mechanism is intended merely to astonish the microscopic observer, and the conclusion is to my mind irresistible, that there must be an important relation between this function of the hairs and the fecundation of the plant; and this even if the pollen tubes cannot be traced from the base of the hair to the ovarium. Notwithstanding all that has yet been advanced on the subject, I confess myself to be somewhat sceptical as to the necessity for the introduction of pollen tubes into the ovarium of any plant.

I have only to add, that subsequent observations on the flowers of another species, *Campanula Rapunculoides*, confirm what I have already published in the 'Journal of Botany' on this subject.

W. WILSON.

January 18, 1843.